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DESCRIPTION OF

A New and Useful Combined Apparatus for Regulating the Flow of Gas to a Burner, and for Electrically Lighting the said Gas.

INNENTED BY P. MUNZINGER,

OF PHILADELPHIA, PA., SEPTEMBER, 1871.

Figure 1 is a sectional side elevation of an apparatus illustrating the invention. Figure 2 is a back elevation, not sectioned.

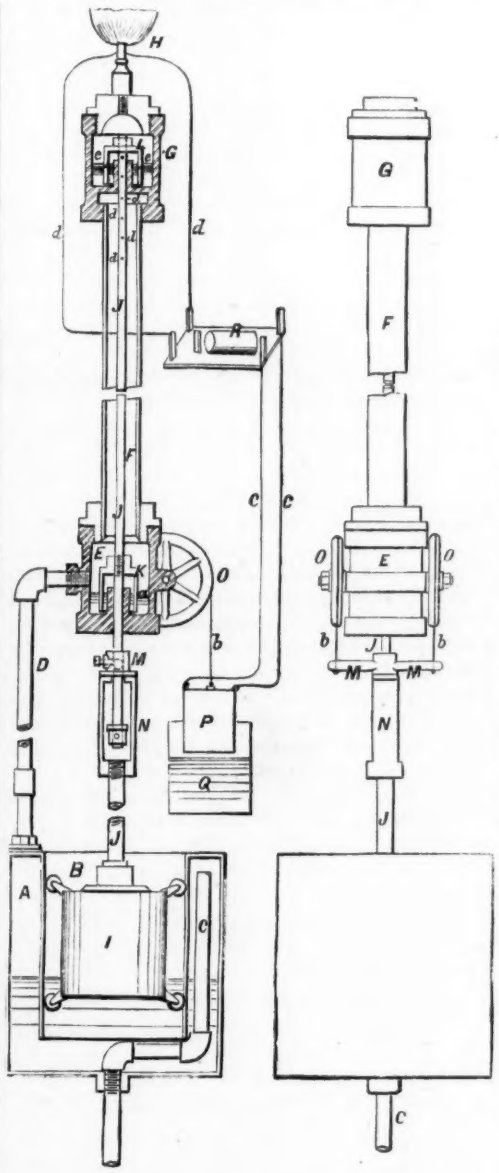
The apparatus is in this instance supposed to be contained within and beneath an ordinary lamp-post.

A B are concentric chambers which communicate at their bottom ends, and are filled to a suitable depth with fluid. The pipe *C* from the gas main, enters the chamber *A* and projects sufficiently above its fluid level to prevent the gas escaping. A pipe *D* conveys the gas from the chamber *A* to the small chamber *E*, from which it is taken by the pipe *F* to the fluid valve chamber *G*, thence to the burner *H*. *I* is a float in the chamber *B*. To it is fixed the valve-rod *J*, which passes air-tight through the chamber *E* by means of an inverted cup *K*, the depending edges of which take into a fluid seal *a*. The upper end of the valve-rod *J* carries the gas valve *L*, which is similar to the seal cup *K*. *M* is a cross-bar fixed to the turnbuckle or length adjuster *N* of the valve-rod *J*. Cords *b b* fixed to the ends of this cross-bar, roll over the pulleys *O* of the chamber *E*, so as to be able to serve as a support to the plate *P* of the battery *Q*. Wires *c c* lead from the electro-magnet *R* to the plate *P*; other wires *d d* lead to the gas burner *H*.

When the apparatus has been properly adjusted and arranged for complete working, and the gas admitted from the main, the current enters by the pipe *C* into the chamber *A*, passes through the pipe *D* to the chamber *E*, and ascends the pipe *F* to beneath the valve chamber *G*, when it circulates through the openings *d* of the valve-rod *J* into the qalve *L*. Simultaneously the pressure of the gas forces the fluid from the chamber *A* into tne chamber *B*, and thus raises the float *I* and its valve-rod *J*, which has the effect of lifting the valve *L*, on the upper end of the rod *J*, until its openings *e* are above the fluid, when the gas in the valve *L* flows to the burner *H*, and continues until stopped at the main. The upward movement of the cross-bar *M*, with the valve-rod *J*, lowers the plates *P* of the battery *Q* into the exciting fluid, when, by the connection of the electro magnet *R*, the burner *H* and the wires *c d*, the electric current is passed through the gas issuing from the burner and ignites it.

The stoppage of the gas at the main, causes the float *I* to lower and drop the valve *L* into the fluid seal of the chamber *G*, and lift the plates *P* from the battery *Q*.

This apparatus is manufactured by Morris, Tasker & Co., Pascal Iron Works, Philadelphia.



Early Philadelphia Gas Tribulations.

The editor of the *Railway World*, apparently an old Philadelphian, says:

"We remember that many years ago, when all the houses in the city were veiled in comparative darkness, and the light from the street lamps was insufficient to enable one to avoid violent contact with the posts on which they were perched, it was proposed to erect works for the manufacture of gas with which to illuminate the black darkness of the highways when the moon refused to shed her light on the metropolis. The elderly ladies discussed the proposed innovation at their tea tables with an urgency which marked most emphatically the extent of their alarm, and many found indubitable indications of the peril that awaited them at the bottom of their tea cups. The young ladies, too, were horrified in contemplating the sooty era which was to follow the introduction of gas, and deetroy the beauty of their apparel, to say nothing of the impending danger which was the theme of many drawing-rooms; while to return to the men, they fought the proposition with a zeal which was commensurate to their fears of the coming destruction of their property.

"The great forte of the opposition was the probability, if not the certainty, of explosion of the vile stuff that was to be substituted for the oleaginous material with which they and their fathers and their grandfathers were accustomed to smoke themselves and the interior of their houses from the beginning to the end of the year, and we remember quite well, that a gentleman of some scientific attainment, who afterward occupied the position of Chief Engineer of the gas works, was among the most prominent of the prophets who predicted the most disastrous explosive results. But the brains of the city got the ascendency, and the men who were most amply provided with that rare commodity brought to a concentrated compass the money that was required for the prosecution of the work, and at length the gas company was organized; the works were constructed, the pipes were laid in the ground, and the city made to dazzle in a new and brilliant light. No explosions took place, no garments were injured from the smoke which was expected to envelop the citp like a pall, and the old women, whether in pantaloons or petticoats, who had fought the new idea well nigh to the death, accepted and availed themselves af the improvement as though they had been foremost among its pr jectors."

The scheme for the purchase of all the gas works of London, by the municipality, which is promoted by the Metropolitan Board of Works—will propose to pay the value of the share capital of the companies, according to their marketable price, for three years previous to the 1st October last. The board will not seek to make any profit by the manufacture of gas, and any surplus which may arise will go to a sinking fund for the reduction of the capital. —*London Journal of Gas-Lighting.*

Chemical Repertory.
No. 127.—February 16, 1875.
EDITOR—HENRY WURTZ.

CHEMICAL EXCERPTS.

1351. Pyrometer.—It appears from a report of a committee of the British Association of Science charged with examination of the above instruments, that, by means of the Siemens electric pyrometer, changes of resistance amounting to about 1-10,000 of the quantity of heat to be measured can be detected without much difficulty.

1352. Big Work.—The progress made in the main header of the Sutro tunnel for the week ending December 10th, under the able management of Assistant Superintendent Jackson, with *four* Burleigh drills, was 106 feet. This is the quickest work of the kind ever done on this coast. They expect soon to be able to make 450 feet per month in the header with four drills. If they keep on at this rate it will not take long to reach the Comstock lode.

1353. Gov. Hartranft on Education.—The recent Pennsylvania gubernatorial message calls attention to the want of skilled labor, and says that although $10,000,000 are annually expended for education, none of the children who complete their term in the public schools have any special fitness for trades, and few become artisans. He recommends the establishment of schools where boys can be instructed in trades, and approves of compulsory education.

1354. Doctors.—We do not agree in the view that the physician will ever become a useless member of society, for the simple reason that, instead of decreasing the share of his duties, the culture of preventive medicine—of the knowledge of how to prevent diseases as well as to cure them after they are engendered—must tend to amplify and enlarge the same. His will be the task, not merely to recognize the forms of ills and endeavor to combat their effects, but to look into the future and, through the aid of all circumstances of the present, predict possible evils and point out means of defense. Add to this the constantly increasing knowledge of drugs and their properties, of the wonderful relations of mind and body, of the nature and habits of disease, which science is rapidly developing, and the physician of the future has before him not a narrower but a far wider field for the exercise of his skill.

1355. The *Cui Bono* of the Mosquito.—This tuneful insect, hitherto considered an unmitigated pest, with no redeeming qualities, has at last found a defender in the person of Dr. Samuel W. Francis, who, after making the preliminary statement that these winged pests are produced in the low, swampy, marshy districts, says:

Taking as my standpoint the aphorism that all things were created for some good purpose, it is my firm conviction that the mosquito was created for the purpose of driving man from malarial districts; for I do not believe that in nature any region where the chills and fever prevail can be free from this little animal. Now, if man will not go after the warning is given in humming accents, then the mosquito injects hypodermically a little liquid which answers two purposes—firstly to render the blood thin enough to be drawn up through its tube, and secondly in order to inject that which possesses the principles of quinine!

1356. A Deadly Well.—The Norwalk, Connecticut, *Gazette* of a recent date says:

"Considerable excitement has been caused about South Norwalk on account of a peculiar and fatal illness breaking out in the large boarding house recently occupied by Mr. Turney Buckley. Nearly every member of the family has been more or less afflicted. Mrs. Buckley died some little time since, and on Friday last Mr. Buckley also died, while a daughter—until her illness a teacher in the Centre district school—now lies very dangerously ill. The case has developed the fact that a loose, porous, gravelly soil has allowed a filtration from the kitchen cesspool into the well from which water for the family was used. Then the drippings from a large refrigerator in the cellar, which was permitted to dampen the entire bottom as the ice melted, no doubt caused a vitiated atmosphere, which increased the terrible scourge. This seems proven by the fact that only those who slept on the ground floor have been seriously affected."

1357. Scientific Work.—Not least among the advantages offered by science is the fact that scientific work must be honest work. The investigator finds that he must work according to the laws of Nature or else fail utterly. During the last session of the Royal Institution, Mr. Francis Galton delivered a lecture "On Men of Science—their Nature and their Nurture," in which, after stating that the ratio of scientific men to the population of England is about one in ten thousand, he shows that the characteristics of those men are energy, health, steady pursuit of purpose, business habits, independence of character, and a strong innate taste for science. These qualities are strongly marked; hence, in addition to the laws of nature, we see a reason why scientific work should be honest work. But among them health stands conspicuous. Mr. Galton records two of the answers he received to his enquiries on this particular—"Only absent from professional duties two days in thirty years;" "only two headaches in my life;" and "never ill for more than two or three days except with neuralgia," the latter being from a man between seventy and eighty years of age. "It is positively startling," says Mr. Galton, "to observe in these returns the strongly hereditary character of good and indifferent constitutions."

1358. Mica-Substitute for Stoves.—A correspondent writes to the *Iron Age* as follows:

Sir: Since the illuminating principle in stoves has become so thoroughly established, and the consequent demand for mica has become so disproportionate to the supply, is it not possible for some of our chemists to produce rome chemical substitute for the same that shall be cheaper and as durable? Illuminating stoves to the household are like pictures on the walls, refining and civilizing in their influence and tendency, and so great a boon to mankind should not be jeopardized by fear of any failure of the supply in an article that possesses the quality of so much pleasure and health-giving comfort. Should this suggestion be within the possibilities of chemical combinations, a liberal reward would be paid by the stove manufacturers of the country.

[We should think that the *Iron Age* might refer its correspondent (a stove-founder) to Dr. A. A. Hayes, of Brookline, Mass.; whose beautiful device for this purpose was given to our readers April 16, 1874.]

1359. London Street-Lanterns.—In some matters we of Gotham are ahead of the great city of the Thames. Witness the following:

The experiment of painting the names of streets on street-lamps is about to be tried in Clerkenwell. There can be no doubt that the plan will prove a great convenience to the public, and that it might be generally adapted with great advantage. On dark and foggy nights especially it is most desirable that facilities should be given to drivers and foot passengers to thread their way through the labyrinth of streets, which even in broad daylight is often a puzzle to those who are not well up in London geography. It would also be a great benefit to the public if the list of cab fares at the different cab-stands were rendered legible at night by means of a transparency. There would be no great difficulty or expense in carrying out this arrangement, and it would prevent these tables being, as at present, utterly useless at night time. Nor does there appear to be any reason why the "fixed points" at which police-constables are supposed to be constantly stationed should not be marked by colored lamps, and persons requiring assistance or protection thus be enabled to find a policeman when he is wanted. Notwithstanding the establishment of these "fixed points," not one person in a thousand has any notion where the points are fixed, and, consequently, so far as the public are concerned, the constables might as well be fixed in their own beds at the stations, where, at least, they may be awakened on an emergency. In fact, there is much more than mere light to be got out of our street lamps, and the sooner we utilize them to the fullest extent the better.—*Pall Mall Gazette.*

1360. Freezing Point.—Krebs.—Schultz shows that the freezing point of water is lowered by dissolving gases. That water holding solids freezes at a lower point is well-known. Thomson and Clausius have shown from the principles of the mechanical theory of heat that the freezing point of water falls 0·007°C for every additional atmosphere of pressure. To determine the true freezing point, take a glass tube closed at one end, fill with sulphuric acid, and heat. Then pour out, and rinse repeatedly. The tube is then two-thirds filled with distilled water, which has been boiled for some time in a clean beaker, and a small quantity of filtered oil of turpentine is poured upon the water. The tube is then carefully heated, without allowing to rise to boiling-point, lest an explosion should ensue, to remove any bubbles which may adhere to the side. The tube is taken out of the oil-bath, cooled, and placed in a freezing mixture. In most cases a portion of it freezes at once, if a thermometer is inserted, and moved up and down. If not the tube must be returned to the freezing mixture. It is important that the thermometer should be cooled down close to the freezing point before being introduced.

1361. Purification of Hydrogen.—After a study of the labors of Dumas and Frankland, Violette resolved to ascertain whether hydrogen gas prepared from zinc, and purified by Dumas's methods, does or does not contain hydrocarbons. The gas was passed through nitrate of lead, sulphate of silver, caustic potassa, and sulphuric acid, and then through bulb tubes filled with a solution of baryta. The hydrogen so purified was conducted into a combustion tube containing oxide of copper, kept at a red heat. The water formed was condensed in a U tube, and the gas then passed into a Liebig's tube, containing caustic baryta in solution. The water obtained being strongly acid, and the baryta solution becoming strongly troubled, the experiments were repeated with gas derived from the electrolysis of water, and with the same result. The author finally proved that the acidity of the water and the clouding of the baryta solution were due to oxygenated compounds of *selenium* existing in the commercial copper which furnished the oxide.

If, however, the hydrogen was prepared with the aid of cast iron—the oxide of copper being freed from selenium compounds—the baryta water was strongly troubled. The author raises a doubt about the accuracy of the statement, universal in chemical treatises, in respect to the presence of hydrocarbons in hydrogen artificially prepared.—*Am. Chem.*

The Petrolem Oil Trade.—A bill was introduced, January 28, in the Pennsylvania Senate is designed to authorize the laying of pipes for the transportation of coal oil from the wells in Butler county and Pittsburg, where the connections can be made, with the Connellsville branch of the Baltimore and Ohio Railroad. The effect of this would be to divert to Baltimore a large part of the oil trade now enjoyed by New York and Philadelphia. The bill is presented as a supplement to the general law of 1874 for the organization of private corporations, but is more especially intended to facilitate shipments to Baltimore.—*N. Y. World.*

Improved Bye-Pass for Dip-Pipes.

For the benefit of your readers, I propose to give you a few illustrations of some new arrangements for bye-passing the ordinary seal of dip-pipes.

The wood cuts below represent three views of the apparatus Fig. 1 a side view; fig. 2 a front view; and fig. 3 a section through the center.

The principal novelty in this arrangement consists in placing an ordinary rotary bye-pass valve on the top of the dip and bye-pass pipe.

By means of this valve the gas from the retorts can be made to pass either through the ordinary dip pipe seal, or through the bye-pass pipe.

As the wood cuts will speak for themselves, I shall not trouble you with any more explanations.

WILLIAM FARMER.

January 1st, 1875.
111 Broadway, New York.

FIG. 1.

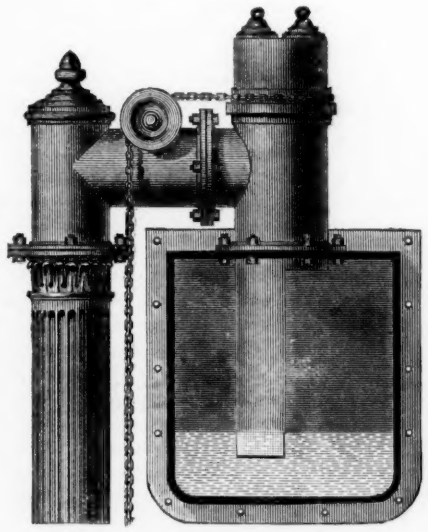


FIG. 2.

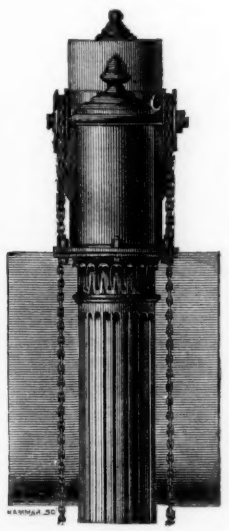
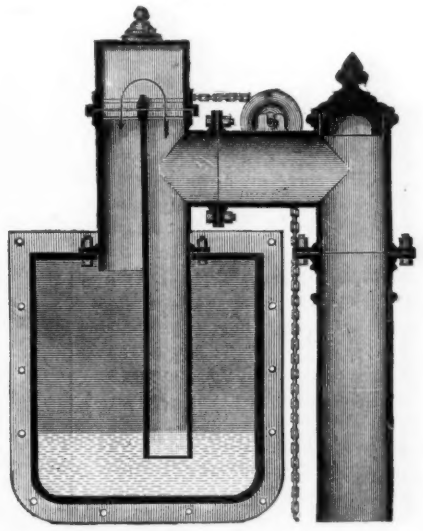


FIG. 3.



IMPROVED BYE-PASS FOR DIP-PIPES.

Specification of Prof. B. Silliman; for Ammonia-Saving.

PATENT NO. 153,727, DATED AUGUST 4, 1874; APPLICATION FILED JULY 15, 1874.

To all whom it may concern:

Be it known that I, Benjamin Silliman, of New Haven, county of New Haven and State of Connecticut, United States of America, chemist, have invented an Improved Process for the Purification of Illuminating and other Gases, and the removal and economical preservation of ammonia mingled with such gases, of which the following is a specification;

This invention relates to that class of processes employed for removing ammonia and its compounds and other impurities mixed with and produced in illuminating and other gases in the process of their manufacture; and it consists in the use of certain acid salts placed in the path of the gas for the purpose of removing ammonia and other impurities.

In carrying out my invention, I take the bye product of acid and alkali works known as "salt-cake," and place it in layers of convenient thickness, in boxes or other form of purifying apparatus familiarly known to gas engineers and such as are now in use for what is known as "dry-lime purification" or "oxide-of-iron purification," causing the gas as it comes from the hydraulic main to pass through the apparatus properly charged with salt-cake reduced to a suitable degree of fineness. This agent completely and immediately removes from the gas all ammoniacal compounds, retaining them in chemical combination in a dry state, gaining thereby an increased value in proportion to the ammonia absorbed and combined.

As all gas engineers and chemists know, the complete removal of the ammoniacal compounds from coal-gas has presented hitherto great and insurmountable difficulties, involving, by the use of water for this purpose, a serious loss of illuminating power in the gas, due to the removal by water of some of its most valuable constituents. By the use of my invention this loss is avoided. All the ammoniacal compounds are withdrawn, the illuminating power of the gas is increased, and the expense of water, which in extensive gas works is very large, is saved to a great extent.

Salt-cake, so called, is a bye product in the manufacture of acids and of soda, and varies in composition accordingly. That derived from the decomposition of South American saltpeter by oil of vitriol in producing nitric and sulphuric acid contains a residue of free nitric acid and of sulphuric acid from the excess of that agent used in the process. This is nitric-acid salt-cake. More rarely potassium nitrate is used for the same purpose, and the salt-cake from it possesses similar and possibly superior powers to that from the sodium nitrate, owing to the fact that it is more completely a bisulphate. When common salt or sodium chloride is decomposed by oil of vitriol, either to produce hydrochloric acid or for sodium carbonate, the salt-cake resulting abounds in free hydrochloric acid, and retains, also, the excess of oil of vitriol. In either case the salt-cake is an anhydrous body, not deliquescent or hygroscopic, readily reduced to any desired degree of comminution, porous, and in all respects admirably adapted to absorb and retain ammonia and its compounds.

I have discovered and experimentally demonstrated that when gas containing ammonia or its compounds is passed over or through a layer or mass of salt-cake properly disposed; it parts completely and at once with all its ammonia, which readily combines with the free acid of the salt-cake until it is completely saturated. The separation is so perfect that no trace of ammonia can be detected by turmeric or litmus paper in the gas after passing the salt-cake purifiers. The ammonia thus combined and removed may subsequently be separated from the salt-cake by any of the methods now in use for this purpose, leaving the soda salt in a state fit for the soda process.

Ammonia is produced in other processes of the arts from the decomposition of organic matter containing nitrogen, exhaling odors of a very offensive nature, of which impure ammonia is one of the most offensive. By the use of my process, in connection with any suitable form of condenser and without water, all the ammoniacal compounds may be removed from such offensive gases, thus abating a nuisance of no small magnitude now existing in the vicinity of many large towns. So far as I have been able to discover, my process removes from illuminating gas in contact with the salt-cake nothing but the ammoniacal compounds, including carbonate of ammonia and ammonium sulphide, with a portion of sulpho-cyanide of ammonium, and probably, also, other compound ammoniums, the nature of which has not yet been fully determined: but all the ammoniacal compounds having been removed, the further process of purification in illuminating gas is simplified and improved, and especially by the absence of any necessity for washing or scrubbing the gas, by the use of water and ammoniacal liquor—a process which if well understood by all gas chemists and engineers to be attended with a serious loss of illuminating power in the gas, while it involves the use of costly apparatus, and, as before mentioned, a large annual outlay for water, producing at the same time only a partial and imperfect removal of the ammonia. the residual portion of which goes forward to the consumer of gas, not only diminishing its light during burning (beyond the loss of power already experienced from the use of water in scrubbing,) but producing also in its combustion a portion of nitric acid.

In the use of my invention, I prefer to bring the crude gas into contact with the salt-cake before it has passed the condenser, but this is a point which must be decided in a given case by local circumstances. If there is a reasonably prolonged flow of the gas from the hydraulic main of, for example, two or three hundred feet of large cooling mains, offering a reasonably good opportunity for the deposit of tar nnd naphthaline, it is better to place the boxes or other form of apparatus containing the salt-cake before the condenser. To avoid the inconvenience in this case from the deposit of tar with the ammoniacal compounds, the use of a layer of breeze or broken coke before the salt-cake is desirable in a manner familiar to all gas engineers. This breeze will require to be changed occasionally, as it becomes coated, to prevent the arrest of flow in the gas, as indicated by the pressure gauge.

To use the salt-cake, it requires to be broken to a coarse powder and distributed upon trays in the same manner that lime and other purifying agents are now used; only that, owing to the greater firmness and porosity of the salt-cake, it may be safely used in thicker layers than can be used with lime.

The progress and completeness in the process of removing the ammonia is readily determined by the use of turmeric test-paper, or of neutral litmus-paper, the first of which turns from yellow to brown, and the second from red to blue, as soon as the salt is saturated and the free ammoniacal salts commence to flow.

The apparatus must then be changed or recharged in the same way now in use in all gas works for lime or iron purification. Care must be taken to avoid bringing lime in contact with the salt-cake in any stage of the process, as such contact would be attended with a loss of ammonia and a frustration of the process. The power of the salt-cake to purify gas of

ammonia depends, of course, on its degree of acidity. which can be detetmined beforehand. Salt-cake from the hydrochloric-acid process in the United States contains usually about twenty (20) per cent. of free hydrochloric with some sulphuric acid. Nitric acid salt-cake here contains from twelve (12) to fifteen (15) per cent. of nitric acid, beside the acid-sodic sulphate; but it is in the power of the chemical manufacturer to prepare salt-cake of any desired degree of acidity, either by the use of an excess of oil of vitriol, forming bisulphate of sodium or potassium, as the case may be, or by arresting the heat of the furnace at a point which shall leave in the salt-cake the acidity requisite to b at flt it tor my process. The product of this process becomes much more valuable than the raw material used in it, each one (1) per cent. of ammonia it receives having a definite commercial value which, in the case of guano, with ten (10) per cent. ammonia, is worth about six (6) dollars per unit at the present time in the United States. Coal contains an average of about one ond a half (1½) per cent. of its weight of nitrogen; but by no means all of this nitrogen reappears as ammonia after distillation. A portion of it is converted into the cyanogen compounds, and a part is probably left free. The cyanides, so far as my experiments have gone, appear to be arrested by the salt-cake, and go to the account of ammonia in the end. After my process has freed illuminating gas from its ammoniaeal impurities it may be passed through any form of condenser which may be preferred, and then it must be taken to the lime or iron purifiers for the removal of the sulphur and carbonic acid. in the manner now practised.

It is well known that the spent lime and iron oxide used in the purification of gas contains a considerable amount of ammonia, so combined that immediately on access of air the spent material commences to heat. and then exhales the odor of ammonia accompanied by offensive vapors or gases, which together have rendered the exposure of these effete products a nuisance in large towns. To avoid in part this evil the ventilation of this spent material is practised in some cases by causing a current of atmospheric air to pass downward through the purifying boxes, after the flow of gas has been cut off, solicited by a powerful exhauster. with a view to removing this evil. If in such cases the current of air from such spent material is carried through boxes charged, as I have herein directed, with salt-cake, all the ammonia contained in the spent lime and iron, which is now a total loss, will be saved and utilized.

In the destructive distillation of animal matters for producing bone-black and the like, or specifically for the production of ammonia, in the boiling down of animal matters, as in bone boiling and rendering, in the sweating of hides, and other like processes where animal substances are employed in a gre.ter or less state of putrefaction or chemical change, ammonia is given off, combined with other offensive vapors or gases. If these products, which are now a source of great annoyance and injury to public health, are carried, by means of a suitable exhauster, through boxes containing salt-cake or other acid salts, as herein described, all the ammoniacal compounds will be combined and removed. For this purpose it may be found desirable to carry such vapors first through some suitable dry condenser for the better condensation of aqueous and other vapors.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The use of salt-cake, alkaline bisulphates, or other acid salts in the removal of ammonia and its compounds in a dry state form from illuminating-gas, or from other gases or vapors derived from the decomposition or destructive distillation of organic bodies containing nitrogen, substantially in the manner above described.

2, The use of salt-cake, alkaline bisulphates, or other acid salts in the purification of illuminating-gas, for the purpose of removing therefrom ammonia and its compounds without the use of water or ammoniacal liquors for washing or scrubbing, substantially as described.

3. The use of salt-cake, alkaline bisulphates, or other acid salts for disinfection of the vapors and gases resulting from the decomposition or destructive distillation of organic matters containing nitrogen for the purpose of removing therefrom any ammoniacal products they may contain, and also for the removal and saving of the ammoniacal compounds derived from the ventilation of spent lime and iron which has been used in the purification of illuminating gas, substantially as described.

4. The use of salt-cake, alkaline bisulphates, or other acid salts for the purpose of collecting in a concentrated form as a dry salt, ammonia and its compounds from illuminating-gas, or from any other mixture of gases and vapors containing the same, in the manner substantially as hereinbefore described.

5. The process of passing illuminating and other gases and vapors through any apparatus charged with salt-cake, alkaline bisulphates, or other acid salts for the purpose of collecting and combining ammonia or its compounds when associated with such gases or vapors, substantially as above described.

BENJAMIN SILLIMAN.

Witnesses:

GROSVENOR S. HUBBARD,
ARTEMAS H. HOLMES.

Correspondence.

[Correspondents, in all cases, should sign their communications with their names and address in full—not necessarily for publication, but as a guarantee of good faith.—ED.

Waier Gas—The Gwynne-Harris, or American Method.

NEW YORK, January 22, 1874.

Mr. Editor: In your editorial, in the Journal of the 16th instant, under the caption of "1874—Our Report of Progress," you very kindly and pertinently refer to the Gwynne-Harris Hydrocarbon process, as one of the greatest improvements in the manufacture of gas. You also very justly assert that Capt. White, of the Citizens Gas Company of Brooklyn, shows that the actual cost of this gas under our process, is considerably within the estimate made by Silliman and Wurtz, who made their figures "in order to be far on the safe side."

You therefore correctly say, "The cost, on a manufacturing scale, of making purified water gas (containing not over 5 per cent. of nitrogen) by the American method, may now be reasonably put at *twenty cents per thousand feet*. This looks like progress."

I should certainly think so, and I do not see how any one can doubt it; especially as all that you say, is further corroborated by the results obtained in the works of the Citizens Gas Company of Newark, N. J., where our process has been in operation, on a large scale, since the first day of June last.

In view of the facts stated by you, you very pertinently ask, "When the world has definitely before it so huge an element of progress as this, why should there be such interminable and pusillanimous delays in taking hold of it?"

It is indeed strange, and, I think, can be accounted for only upon the grounds: 1st. That because the efforts made many years ago, to make water-gas in England failed, therefore, it is taken for granted, that even we Yankees, cannot successfully produce it. and 2nd. The cost of making this gas, under our process is *so small*, and the profits *are so enormous*, that even the most indubitable proofs from the records of gas companies, and of their able and unimpeachable engineers, are actually doubted, as being incredible.

To those who understand the subject, their failure in England is apparent. 1st. They then had nothing but *iron retorts* and *iron apparatus*, whereas iron cannot stand a degree of heat sufficient to decompose the steam. 2nd. They did not, and *could not*, superheat their steam to the degree that we do, before introducing it into the retort for decomposition. 3rd. They sent their steam *in a stream from the pipe* into the retort, and a portion only of the steam was decomposed. The consequence was, the production o a large per cent. of carbonic acid gas, which, brought into union with coal-gas, destroyed all the illuminating power that the richest coal-gas contained. Is it any wonder that *they failed?* And is it incredible that "we Yankees" should discover their difficulties, and overcome them!

We use *clay* retorts and superheaters. We raise the steam to 2,500 or 3,000 degrees of heat We then send it into 'chambered tiles *under* the incandescent decomposing material in the retort. which distributes it *in finely divided jets*, and then it passes *through* the incandescent anthracite coal, and is perfectly decomposed, and thence issues a perfect gas.

Many *sneer* at the idea of making gas *from water*, and many others, who are candid men, and desire to adopt any genuine improvement, do not understand how it is that *steam* passing through one of our retorts comes out a *gas*, which burns with a fierce flame. It is to them *a mystery*.

They do not seem to know, or they forget, that *water itself* is composed of *two gases*—oxygen and hydrogen—and that we simply resolve it *into gases again, by decomposing it* under our process.

It is just as simple and certain as that *heat* will turn *snow* or *ice into water again*. I have full confidence that the intelligence of our American gas manufacturers will not long allow them to disregard this greaimprovement, because England failed to discover it.

Some thirty years ago, one of the most eminent scientists of England, while admitting his failure, insisted that *the principle was correct*, and that the time would come when the true methed of producing "water gas" would be discovered. The proverbial "Yankee ingenuity" has simply fulfilled his prophecy, and there ought to be no surprise at that fact.

The greatest difficulty we encountered, was to perfect our apparatus, so as to produce the gas with the greatest facility and regularity, and without loss from the cracking and leakage of the retorts and superheaters. This difficulty, after many persistent efforts, and to the discomfiture of *theorists*, we have fully and successfully overcome.

One of our benches after running sixteen months, was let down because the *furnace* had burned out and was in danger of falling, and the retorts and superheaters were then found to be in perfect order.

I have a letter from J. Pearson Gill, Esq., Engineer of the Citizens Gas Company of Newark, N. J., addressed to me, under date of November 27, 1874, in which he says, "The benches running under your hydrocarbon process have been in constant use since the 1st of June last, and we have had no trouble whatever with them, and have lost no time in consequence of stoppages, leaks, or repairs."

I have also a letter from Capt. William H. White, Engineer of the Citizens Gas Company of Brooklyn, N. Y., under date of December 10, '1874, as follows:

"In reply to your favor of 8th inst.; I have the pleasure to state, that I am still working successfully the Gwynne-Harris Hydrocarbon Process at these works. The benches built over eighteen months ago, are still at work and show no signs of deterioration. The hydrogen is produced freely, rapidly, and of good quality for our purposes, and I see no reason whatever to change my views upon the subject of this process."

In a circular lately issued by our company, we have briefly stated *the facts* respecting our process, and the positive proofs which show the *great profits* arising from its use.

When coal-gas costs $1.50 per 1000 feet, *in the holder* and a far superior gas can be delivered there for *forty two cents* per 1000 feet, *somebody* ought to have the benefit of it.

H. B. ALLEN,
President National Coal-Gas Co.
No. 4 Warren Street, N. Y.

An Inquiry.

BURLINGTON, IOWA, January 25, 1875.

Mr. Editor: When the "*practical*" man, unaccustomed to expressing his thoughts to others in writing, fails to be precise in the use of language, he is excused by common consent, for the obvious reason that he is unskilled in that particular line; but when we take up a written statement of one of scholarly at-

tainments, occupping a prominent position as an instructor of others, and especially in scientific matters, we have a right to expect carefulness of statement and exactness of expression; and the value of the statement of facts must necessarily be impaired by the want of such care and exactness.

These thoughts arose in my mind while reading Prof. Chandler's report of experiments with the St. John and Rockwell's scrubber, at the Harlem Gas Works, published in the Journal of 16th inst.

The Professor says: "The ammonia contained in the gas was 2.65 grains in 100 cubic feet, which proves that your process of *condensation* is as effective for removing this substance as the old methods, etc.' The very next sentence commences. "No condenser, washer, or scrubber of any kind was used." In the next sentence it is stated that "At the close of the experiments the condensing apparatus was opened.' Again, a little further on he says: "Nearly eleven thousand feet of seventeen candle gas *of good quality*, from a ton of coal, etc., etc." Again: "That the removal of tar and ammonia waters from gas does not depend upon cooling, *i. e.* condensation."

Now I submit whether such carelessness—to use no harsher expression—in the use of language by one occupying Prof. Chandler's position, does not very materially detract from the testimony presented.

Will not Prof. Chandler rewrite his report, and let us know whether this is a "condenser" or not, a "scrubber" or not. Whether the gas is "cooled, *i. e. condensed*" or not, and thereby oblige interested readers.

Truly yours,

PLAINNESS.

[EDITORIAL NOTE.—The writer of the above left to our judgment the propriety of its insertion. On consideration it appeared to us quite proper and appropriate to give it space, provided that Prof. Chandler had an opportunity, if he desired so to do, to append to it remarks in rejoinder. That gentleman, accordingly, after perusal of the above, handed us the following comments.]

Mr. Editor; In reference to the communication from Burlington; Iowa, which you showed me, I submit the following few words.

Among practical men terms have often acquired meanings widely divergent from their original scientific significance. A single illustration will answer:

Saponification means literally conversion into soap, yet it is used by the most scientific writers in speaking of any decomposition of a fat—by steam for instance, or even by sulphuric acid—from which glycerine and fatty acids result.

Condensation is applied to compression, or to the liquefaction of a vapor or gas. In practice among gas men the term includes much more, *i. e.*, liquefaction of aqueous vapor and the separation of tar globules in spray, etc. The scientific teacher in speaking to practical men is compelled to follow a middle course between the (to them) exact but unintelligible language of science, and the familiar but often false terms of shops.

Yours etc.,

C. F. CHANDLER.

Lighting Railway Cars.

TREVERTON, NORTHUMBERLAND Co., Pa.,
February 5th, 1875.

Mr. Editor: I have just received the *Gas-Light Journal* of the 2nd instant, containing article from *The Engineer*, relative to lighting railway cars.

I enclose an article from the *Reading Eagle* of October 29th, detailing the conclusion of a long series of experiments and endeavors by Mr. Henry H. Edgerton and myself. We long since proved the practicability of this matter to our satisfaction, but it was not until after Mr. Edgerton went to New Orleans, that I was able to conclude arrangements with Messrs. Franklin B. Gowen and John E. Wootten, the President and General Superintendent of the Philadelphia and Reading Railroad, to build a gas works, and arrange to use the gas in their cars. This, however, was done, and their gas works elicit the admiration of gentlemen prominent in the ranks of gas engineers. Their appliances for compressing the gas are as far superfor to those described in *The Engineer*, as a steam engine of to-day is to one of twenty years ago. With the exception of the retorts and their connections, which are under my patents, the whole apparatus is the design and construction of Mr. Wootten and his assistants.

The entire arrangement, which supplies not only the passenger cars but the extensive shops and depots of the company, consists of two benches of retorts and a gasometer, for the manufacture and storage of the gas. From the gasometer one outlet supplies the depot, shops, etc., and a separate outlet supplies the pumping engine by which the reservoirs are filled up to a pressure of 240 to 300 pounds to the square inch. From these reservoirs the gas is conducted under the depot platforms to cylinders underneath the cars, and the filling of these cylinders occupies scarcely a minute's time each, and is done during the regular stops of the trains; no detention ensuing on that account. Each car carries one cylinder, and a sufficient supply of gas for at least twenty-four hours continuous use, which is practically two nights supply. From these cylinders the gas passes through regulators, which are the invention of an employee of the road, Mr. A. H. Phillippi, to the burners. The burners are ordinary open burners of small size (1 ft. tips) and are entirely unprotected by glass or shades of any kind. Sometimes three, and sometimes four burners are used for each car, and the light is sufficient to enable the passengers to read, and the conductor to inspect his tickets and currency with ease and comfort. The accounts of the company show that the light from this gas costs less than one-third as much as that of coal gas at $2.50 per 1000.

These works are under the more especial charge of Mr. William E. Good, the chief draftsman of the company, who made the designs for the pumping engine, buildings, etc. Before adopting this new departure, the officers of the company made the strictest investigation into its merits, and for the sake of the travelling public in general, it is to be hoped that our other railroads will soon follow in their lead.

So you see that in other lands they are not "going far ahead of us," after all. They are *in an experimental way with rude machinery*—40 candle gas under 90 lbs. pressure. We have *in practical and general use*, on the Philadelphia and Reading Railroad, 70 candle gas, under a pressure of 240 lbs. and upwards, the entire machinery and appliances for which are of the most thorough description.

Yours respectfully,

J. DESHA PATTON.

[Below is the item from the *Rerding Eagle*, referred to by Mr. Patten.]

LIGHTING CARS WITH PEEROLEUM GAS—A NEW ERA IN LIGHTING RAILROAD CARS.

"The Philadelphia and Reading Railroad Company have commenced the use of petroleum gas on their cars. The first passenger car the regular train ran from Philadelphia to Reading on Tuesday night, October 27th. The result showed a magnificent light, with a consumption of about one-fifth the quantity of gas formerly used. The experiment proves that the trouble heretofore experienced in lighting cars with gas has been overcome, for now a sufficient quantity can be carried to light cars on a long trip.

"The complete success which has attended the building of gas works by the Philadelphia and Reading road in this city, and the manufacture of gas by Mr. Patton's patent out of petroleum, is very gratifying to all those interested in the enterprise. Superintendent Wootten and Mr. Phillippi are particularly to be congratulated on the successful working of the gas works, as other railroads will soon apply this gas to the lighting of cars, thus doing away with the foul and impure smell of coal oil in the cars. Reading thus has the credit of being the first city in the country where petroleum gas is made and used for lighting railroad cars."

Oxygen.—In the establishment of Krebs, Kroll & Co., Berlin, oxygen is prepared by heating together in a glass flask, in a water bath, 10 quarts of water, 10 lbs chloride of lime, and 1 lb. nitrate of copper. It produces 14 cubic feet of oxygen.—*Laboratory.*

[Original Communication.]

Sunday Rest.

By E. S. CATHELS.

Mr. Editor: I have just laid my hand on the following on "Sunday Labor in Gas Works." It was nearly all written immediately after the paper on that subject appeared in the Journal; but being put aside, was entirely overlooked until now. I have added what little was left unsaid, and send it to you for publication, if you deem the subject still of sufficient interest, or for the waste basket if you do not.

Having passively "assisted," as an eloquent listener, at the late meeting of the American Gas-Light Association, in Brooklyn, I was much interested in the very able paper on Sunday Labor in Gas Works, contributed by Mr. Walker of the Milwaukee Gas Company. Unfortunately, owing presumably to want of time—a good deal of the limited time of the meeting having been unavoidably occupied in discussing and framing the Constitution of the Association—there was no discussion on the paper. In addition to hearing it read at the meeting, I have carefully read it in the Journal, and have also read the communication on the same subject alluded to in it (and which I had overlooked previously), written with such ability by Mr. Forstall, of the New Orleans gas works, which appeared in the Journal of 17th August last, and would like to say here, what I would probably have said in substance at the Meeting, had a conversation followed the paper.

I have suggested that a probable reason of the absence of remarks on the subject of the paper, was the exigency of time; but it is also fair to assume, that perhaps another, and more sufficient reason, was the general concurrence of the meeting in the sentiments so well expressed, and also urged so forcibly in Mr. Forstall's letter.

These sentiments are so laudable, and reflect so creditably on the humanity of both gentlemen, that one feels almost as if he were a "political economist," or some other fell monster of inhumanity, in venturing to advance anything that may even *appear* hostile to the commendable views in question. But while emphatically disclaiming any desire to see men—especially stokers, whose work is so trying—working seven days a week, when it can be avoided, particularly working seven days for six days' wages. I am bound at the same time to state, however reluctantly, that I am unable to go entirely with these gentlemen, either in their opinions or experiences, in respect of this question.

Now, at the outset it must be admitted that it is extremely desirable that every man, whatever his occupation may be, should have at least 24 hours every week at his own disposal, and wholly free from his daily labors, whether physical or mental; just as it would be equally desirable that every deserving human being should be able to command the necessaries, and enjoy the comforts of life. But it appears to me that the question has a broader bearing, and is possessed of more sides, than these gentlemen would seem to suppose.

Gas-making, like all other businesses, is a question of dollars and cents; and the arrangements made with, and the remuneration received by, the employees of gas works, is like all other labor, essentially a question of supply and demand, tempered, it is to be hoped, as it ever should be, by kindliness of feeling and liberality.

I was aware that the experiment of ceasing the carbonizing, and so relieving the stokers during the first 12 hours of Sunday, had been tried in England, and is now being carried out, I believe, at some works there; but I had no idea that operations had been discontinued for the whole 24 hours round anywhere, until I read Mr. Forstall's letter, and I am glad to hear of the experiment being so successful at his works. But, although perhaps possible in some places, and under certain favorable conditions, I am afraid it is an indication of generous enthusiasm, rather than varied experiences or mature reflection, for that gen-

tleman to jump to such decided conclusions, about its being equally possible under existing arrangements anywhere. I am inclined to think that experience in the gas supply of a smoky and foggy English manufacturing town, would somewhat modify Mr. Forstall's conclusions. With nearly empty holders to begin with on Monday morning, and the gas being consumed all day about as fast as made (not an unusual occurrence at certain times of the year) he would doubtless get rather nervous as evening approached, and fervently wish it were midnight. Mr. F. may fairly retort that such a case does not invalidate the righteousness of the principles he advocates, and that gas companies ought to provide sufficient storage, and otherwise make such arrangements, as to enable cessation from gas-making on Sundays to be effected; and this brings us to the whole gist of the matter. People who invest in gas stock, do so with the view to get a fair interest on their money; and if by legislative enactment, the pressure of municipal authorities etc., or, in other words, the public, so trammel gas companies as to price and quality of gas they supply, that they cannot realize the profits they are fairly entitled to, without Sunday labor, so long will it be continued. The question, it seems to me, thus rests neither exclusively with the directors, shareholders, nor the managers of a gas company, but with the consumers and public generally. It may be contended in answer to this objection, as both Mr. Forstall and Mr. Walker seem to do as regards their respective cases, that little or no loss results from the practice of stopping the works on Sundays; but it is difficult to understand how that can be, especially in stopping off for 24 hours. Far be it from me to call in question the good management and favorable working of these gentlemen, but I think it is asking a little too much to ask us to believe that there is no loss in ceasing to use the whole productive plant for one seventh of the entire year—indeed for longer than that, because the full efficiency of the retorts cannot be obtained for some time after resuming work on Monday morning, as but part charges must be put into a portion of them, to bring them round to the regular times of drawing, with consequent diminished production of gas for that time, aggravated by the inevitable opening, to a greater or less degree, of the cracks in them. But apart from the important consideration of profit, and regarded merely as to capability of supply of gas, I think it may be taken, that without radical changes in the economy of gas works, especially in large concerns subject to irregular and unforseen demands on them, the idea of throwing the whole productive plant out of action for 24 hours each week, to be altogether impracticable. But many agreeing in the impossibility of practically carrying out this desirable end, may yet be favorably disposed to a 12 hours cessation from gas-making on Sundays. But even to that modified course there are practical objections, some of which I think both Messrs. Forstall and Walker regard as of little weight—and in which I for one am unable to agree with them—such as having say 12 hours clinker to clear out of the furnaces, on the men resuming work, while there is one which the men justly regard as of great importance, that both these gentlemen seem to have entirely overlooked. This last I found to be so formidable, as to be the chief cause of my efforts in this direction a few years ago being shipwrecked. Shutting down the works for 12 hours on Sunday (invariably I believe, where the experiment has been tried, the first 12 hours), can only benefit half the men, viz.: Those who happen to be on the day shift—there being not only no relief to the night men, but a positive *addition to their work*, in extra clinkering and bringing the charges round again to their usual times. Indeed this was so serious that the men declared they would as soon work all day, as well as the night, to prevent the derangement that had to be righted every Sunday night by them. It may be that where four hour charges are worked, this is easier than in the case of six hour charges, where coal is small, and stubborn to be carbonized, like Newcastle coal.

In Mr. Forstall's communication there is the following paragraph:

"The statement that in one gas-works in England the men themselves petitioned for a resumption of labor, proves either that their wages for six days were insufficient to support their families, or that they were so brutalized by their previous treadmill life, that they had lost the sense of everything outside of it. In the former case it is a good argument for higher wages; in the latter it supplies the best possible reason in favor of the system which it is brought forward to condemn."

Now this rather sweeping paragraph has reference to the works I was last connected with, they having been adduced by, I think, Mr. Littlehales of Hamilton, as an example of the experiment having been honestly tried, and given up at the men's request, when the subject was under discussion at a meeting of the Gas-Light Association. I am therefore in a position to somewhat blunt the sting of Mr. Forstall's *ad captandum* assertions. Because a certain line of action is possible in New Orleans or Milwaukee, it by no means follows that it is equally easy of attainment everywhere else. As well might Mr. Forstall try to persuade us "Canucks" that the clothes he is wearing in New Orleans would suffice for Canada just now, with the thermometer varying from ten to twenty degrees below zero, and the wind blowing keen enough to "strip a feather"; and, with all due deference, I must say that the gentleman's advocacy of the cessation of Sunday labor appears to me to be an instance of enthusiasm, carrying an able man "off his head" on that particular subject. I don't know anything of these gentlemens experiences with working men, but mine has been that working men are so much like "other men," so far as their personal interests are concerned, that it is difficult to distinguish "t'other from which." When a body of men deliberately elect to pursue one course in preference to another, it may be assumed that they know what they are about, an explanation I think to the full as reasonable as calling them "brutalized," because they happen to dissent from one's pet "doxy," a line of argument (?) I believe I have heard used before by other "goody" people.

As to the wages of the men in question, they were, I believe, equal to what other gas companies in London and neighborhood were paying, and most of them have been years in the company's service. Each man had every fourth Sunday off, *i. e.*, from Saturday at 6 P.M. to Monday at 6 A.M., for which time he was paid. This privilege I extended with the full sanction of the directors—who are ever ready to treat the men generously—to every third Sunday, and I had intended to advocate its extension to every alternate Sunday during the summer months, if found to be practicable. The difficulty in carrying the principle further, was in filling the places with men competent for the work, for even retort-house work, particularly in scoop charging, requires some experience. As to being brutalized—a number of the men were teetotalers, and perhaps competent to argue the question out with even Mr. Forstall. I should, however, explain that, although I have used the word Sunday, practically they could not all get off on that day, during the busy season, through not being able to fill the places, some therefore had Monday or Tuesday instead. But as they preferred having a week-day in lieu of Sunday occasionally (which was doubtless very wicked of them) to enable them to go shopping with their wives, etc.; and as they arranged that among themselves, there was no difficulty experienced.

I purposed saying a few words in reply to certain things advanced in Mr. Walker's paper; but as there is a limit to both your space and your readers' patience, I must desist, apologizing for the sea-serpentish "elongation" of what I *have* written.

While entirely concurring in the desirability of abolishing Sunday labor, I do not think that the general adoption of "shutting up shop" in gas works for 24 hours each week to be practicable, and as respects the 12 hours closing, that has also a reverse side. Still it is doubtless desirable that the men should have as much relaxation as possible, and this they obtain in many works to a considerable extent in some such arrangements as have been indicated above.

Water Items.

MEADVILLE, PA.—We have an apology to make to Robert Cartwright Esq., of Rochester, who posted us many weeks since regarding the operations at Meadville, of which he is the chief engineer. The reservoir, to which the water is to be pumped through a 12-inch main from the river, will be 300 feet above the latter, and will cover nearly an acre of ground, with a capacity of four millions of gallons. This amount is estimated to supply the ordinary demands of the city for six days.

The reservoir is located considerably higher than the roof of Allegheny College, and somewhat higher than the pinacle of the spire of the new First Presbyterian church.

John McNeal & Sons, of Burlington, N. J., have taken the contract to furnish the pipe for the entire works at a price most favorable to the company, and probably the lowest contract ever made in this country for a similar work.

The pipe is all to be delivered here before March 1st next, which implies that the company intends to "push things." Those who know the chief engineer will remember that, as one of his strong points.

Mr. Cartwright will superintend in person the laying of the street mains, as he says in this work the greatest expense present and prospective, can be saved by proper construction.

NEWCASTLE, ENGLAND.—Here the trohble is that the water of the Tyne is *peaty*. The most eminent of water-chemists, Wanklyn (of whom we avow ourselves a disciple) found as much as 25 grains of solid matter per gallon—equal to about 21 grs. per U. S. gallon—and 1·2 grains of chlorine. The albumenoid ammonia was about twice that considered admissible in a good drinking water. Although he concludes that there has been no sewage contamination, he yet reports decisively against the use of the water, without previous separation of the peaty organic matter. These questions of peaty waters are to come up shortly among us.

Hoboken, et al.—We do not know whether or no any of the dwellers on the Palisades, in the breezy locality hight "West Hoboken," have read our protest—in issue of Oct. 16 last—against the extraordinary "independent" North Hudson County Hackensack Water-Project; but, after letting the thing be carried by default, as we feared it would be, it now appears that a powerful opposition is orgsnizing, and in the very town where the reservoir was proposed to be located. The two following announcements appeared during the third week in January, within a day or two of each other—

—A petition is being freely circulated, to be presented to the committee, asking them to take action against all assessments for the proposed water-supply.

—The protests against the water-project are rapidly receiving the signatures of the citizens and property owners. Some 200 names have been obtained in the last two days.

PEEKSKILL, N. Y.—It is now some weeks since it was announced that the application of Frost Horton for a permanent injunction against the Water Commissioners of Peekskill, has been dismissed by Justice Barnard. The legal objections having been thus removed, the Commissioners will proceed with their work as proposed.

RECENT BROOKLYN TROUBLES.—The consumption of Brooklyn water recently ran up so high as to produce a "water scare." January 19 it was stated that the consumption was near 37 million gallons. The Board of Works took action, and a report was at once circulated that they only wanted an excuse for another application for more money for the new reservoir at Hempstead.

On the 24th ult. it was stated that the scare was over, five citizens having been fined $5 each for let

ting water run all night; and on the 26th eight more were mulcted likewise.

Mayor Hunter has expressed doubts about the new reservoir being able to hold water, and thinks no more money should be appropriated for the work until this fact is ascertained.

February 3d it was reported that a delegation of taxpayers waited on the Mayor to protest against any further increase of taxation on account of the water works. The Mayor promised to carry out the wishes of the delegation.

LEEDS, ENGLAND.—This inland city of over 260,000 people, is in an apalling condition, as regards both drainage and water-supply. It sends into the river Aire, to pollute its further flow, eleven million gallons per day of sewage, in dry weather. *Injunctions* against the city of Leeds are the order of the day. Their public wells also give them trouble. A recent Police Report states that a number of persons were summoned for using water from wells said to have become polluted so as to be injurious to health Among these, four persons were summoned for the use of a well at Moortown. The analyst,s report on this well stated that the substances found in the water were indicative of sewage contamination. He found ammonia and nitrogenous organic matter in proportions largely in excess of those contained in wholesome drinking water. The persons summoned stated that they had applied for the town's water, and were willing that this well should be closed up. An order was therefore made that it should be closed at the end of two months from this time.—The next case was that of a public well near Chapel-Allerton, which was reported on in similar terms to the others. It was stated that three years ago there was a severe outbreak of fever here, the cause of which was traced to the use of the water in this well. It was found that the sewage from several houses percolated into the well. A notice of this application to have it closed was posted on the pump, but no one appeared against it.

CINCINNATI.—The *Commercial*, of this city, is not complimentary to the engineering talent of their water distribution. It says "at a recent fire some of the engines were obliged to stop for want of water. A twenty-inch main is supplied from a thirty-five-inch main, and the connecting or supply pipe is only a ten inch pipe. In addition to this the reservoir from which the water must come is so small that the sediment is disturbed whenever there is any unusual demand for water, and thus the pipes are partially filled with mud and sand and the other numerous ingredients of Ohio River water."

BOSTON.—It was announced in November last that "the water supply of Boston has become so limited that the Board has requested the co-operation of all consumers to assist in suppressing waste and observing the strictest economy in its use, as it is evident that unless the daily consumption is largely reduced a water-famine will ensue before spring, in which case the supply for consumers must be limited to certain hours of the day."

HUDSON, N. Y.--New water-works have recently been completed. The water is pumped from the Hudson River, forced to a reservoir at an elevation of over 300 feet, and thence distributed throughout the town. It is stated that the height of the reservoir makes fire-engines entirely unnecessary. On a trial of the works on the 20th of November, eleven streams were thrown simultaneously at various parts of the town to heights averaging 175 feet, and, at a given signal, seven hydrant streams were concentrated on the highest building in the place, the water passing over the flagstaff, which reaches to a height of 120 feet.

JERSEY CITY, N. J.—The *Journal* says—Our city water works have earned for the city—since April, 1872, and the cash has been paid into the treasury—$1,261,908·23, more than half a million dollars annually. Yet the parties who raise the outcry about the city debt never mention the fact that the city owns this productive property, and that more than a third of the city debt accrued on account of these same water works, which are now so profitable as well as indispensable to the city. But that is the idea some men have of telling the truth—tell only what suits your purpose and suppress the rest. But is there any honesty in such a proceeding?

WASHINGTON, D. C.—January 30th the U. S. Navy Department building was fired by an incendiary for the fourth time. Hopes, founded on the deficiency of water-supply, seem to have been persistently entertained by somebody of destroying some public records obnoxious to the said somebody.

ELIRABETH, N. J.—The new reservoir of the Elizabeth Water Company gave way in the night recently. The company assures the public that even in case of a large and sudden break, there is no possibility of danger to any persons or property near the reservoir or creek, and there will be a full supply of water from the old reservoir till the new one is again fixed and filled.

LANCASTER, PA., Feb. 6.—Owing to the freezing of the pumps at the city water works, the reservoir is entirely empty, leaving the city without water to the great inconvenience of the factories and citizens.

The Sanitary Superintendent of Peoria does not think well of well-water, which is making many of the inhabitants ill, and advises the adoption of some othet system of water supply.

NEW ENGLAND AND UP THE HUDSON.—Great trour ble exists this winter all through this region from want of water, from the drying up of wells and streams. No rain in New England, it is said, for several months.

A San Francisco paper says that as a really definite proof of the unprecedented growth of the city, in the last twelve months the Spring Valley Water Company have supplied 1,532 new houses with water. Since May last the increase has so greatly augmented that now the water company place each month 150 new houses upon their list.

Pumping Machinery.

The official report of the Vienna Exhibition contains the full details respecting the pumps exhibited by the various manufacturers. Of these, Messrs. Hayward, Tyler and Co.'s Universal Pump was, "in the opinion of this section of the jury, by far the best specimen of the type in the exhibition. It is admirable for the excessive simplicity of its mechanical arrangements. The only moving part exposed to view is some two or three inches of the piston rod. Valves and valve-gear are all internal, and of the simplest sort. At first sight it seems to be a mystery how the machine works, for not only is there no gearing of any sort visible, but also there seems to be no place in which to stow it away, supposing it to exist. It is only on inspecting the drawings that it is discovered that the piston itself, besides fulfilling its own proper function, serves also as a steam chest, containing the valve for the distribution of the steam, and also the means for making it self-acting. In order to do all this the piston is necessarily made very long, it is, in fact, more than half the length of the steam cylinder, which latter is consequently more than double the stroke. The pump valves are balls made of a composition of gutta percha of about the same specific gravity as water. The seatings are of gun metal, and have never to be replaced on account of the softness of the balls, while these latter when worn out can be renewed with ease. When applied to mining purposes, pumps this nature may be situated at the bottom of the shaft while the steam generator is on the surface, a point of the greatest importance. All the moving parts being unexposed, the machine is little liable to get out of order, and will work well even after months of exposure and neglect. The piston-valve is so arranged that the engine will start work at any part of the stroke by the simple act of turning on steam. This latter quality is a great advantage, for it sometimes happens that, through an accident, the engine, and consequently the starting-gear, are inaccessible, and when this is the case the pumping has to be suspended. With the Universal Pump, however, this need never happen. There is an instance on record in which a mine provided with one of them was completely drowned. There being no second pump available, all operations had to be suspended for some time, till the attendant, remembering this quality of his engine, conceived the happy idea of getting up steam in his boiler on the surface, and of letting the steam have free admission to the felted pipes which led to the drowned pump below. The experiment answered admirably, for the engine started work of its own accord, and succeeded in pumping itself and the mine dry."—*Iron.*

Coke Ovens.

Mr. J. Bustard, of Barnsley, has lately built for the Dodworth Silkstone Coal Company a number of coke ovens on an improved system, which, after thorough tests, have been found to work well. The system is a very simple one, and the cost of the ovens no greater than those of the ordinary pattern. The ovens are built in two rows, back to back, with a flue running between them, each having an aperture communicating with this flue, but so arranged as to be opened or closed as required by means of a damper.

The heated gases from the ovens pass along the flue to boilers or pipes containing water, so that steam is raised to supply the engines either at the pit or any place near to the ovens. But when the heated gases are not required they pass direct to the chimney shaft by using dampers at the end of the flue. The result of constructing the ovens in such a manner is to produce a quick draft in the flue and complete combustion in the ovens, so that, the gases being drawn off quickly, the coke is improved in quality and increased in quantity. A considerable improvement has also been effected by Mr. Bustard with regard to the charging of the ovens by means of a tramway over them. The cars with the coal pass along the tramway, and there being an opening in the ovens between the rails, the coal is tilted from the cars into the ovens. The drawing of the coke is done most effectually and quickly. For that purpose a rake with teeth projecting upward is placed on the floor of the oven, being covered with a sufficient coating of clay to protect it from the fire, and when the coke is made and the gases drawn off the doors are opened, and the rake being attached by a chain to a windlass the coke is pulled out by the engine in a solid mass whilst hot. By taking the coke out hot, time is saved by not having to cool it whilst in the ovens, while the latter can be recharged before they have had time to become cold.—*London Mining Journal.*

Manufacture of Oil-Stills.—C. Cunningham, Brooklyn, N. Y.—A vertical pipe passes through the oil-chamber, and is connected at its lower end with the bottom, and provided at its upper end with a horizontal or cross flue, open at both ends and communicating with the surrounding flue for bracing the bottom of the still, and providing an enlarged heating surface. The vertical pipe or flue is connected with the bottom, and having at its upper end the cross-flue, open at each end, is provided or controlled by dampers, in combination with the surrounding flue and chimney, whereby the heated gases may be regulated in their passage to the chimney for causing the said gases to circulate within the surrounding flue, or pass directly out of the chimney. An arch, and tension-rods connected to the arch and the cross-flue, assist in supporting the cross-flue.

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TUESDAY, FEBRUARY 16, 1875.

WISHING TO MAKE THIS JOURNAL an organ of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, the publishers solicit letters from all among them who make the study of these subjects a pleasure, or a profession.

Subscribers would confer a favor upon us by remitting *CHECKS*, or *POST OFFICE MONEY ORDERS*, as we are frequent losers where money is enclosed in letters.

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☞ SPECIAL NOTICE.—Owing to the sudden and severe illness of the Editor we are unable to give the usual amount of editorial matter in this issue. The next number will amply supply any deficiency which exists in this.

OBITUARY.

GEO. W. PARSONS.

In our last issue there appeared a few short lines announcing the death of Geo. W. Parsons, Esq., of Rochester, New York. Through the kindness of Messrs. Matt Cartwright and Thos. C. Montgomery, both friends and colleagues of the late Mr. Parsons, we are enabled to give the following brief resume of the life of deceased.

Mr. Parsons was born in Cazenovia, Madison County, New York, on the 4th of May, 1812, from whence he went to Rochester in 1837. He was first engaged as a pattern maker, in the foundry of Kempshall & Bush, and continued in this capacity till 1849, when the Rochester Gas-Light Company having completed its works, he accepted the position of Superintendent, which position he retained till his death. As formerly stated his demise occurred on the 31st of January, and his remains were interred on Thursday, February 4th, with many solemn and impressive ceremonies. He was very popular in his profession, and his loss will be deeply felt by the Fraternity of which he was such a useful member.

DETERMINATIVE MINERALOGY.

We have from the publishers. John Wiley & Son, 15 Astor Place, the "Manual of Determinative Mineralogy, with an Introduction of Blowpipe Analysis," of Professor George J. Brush, Professor of Mineralogy in the Scientific School at New Haven—just published.

There are doubtless, among our readers, those who would surely like to know, if not to practice, the art of distinguishing with certainty, the nature of the products of the solid earth; and such must have this book, which condenses the whole knowledge of mankind in this practical specialty. The ideas of many men are vague on the the subject of the determination of a mineral, and some no doubt think there is in it some sort of *hocus pocus*, or mystery, unattainable except to the initiated. True, a mineralogical eye often has faculties, natural or acquired or both, which are surprising; but by examining this book it will be found that the whole is now reduced to a matter of system and routine; so that any man of ordinary intelligence may learn, with proper, but simple, laboratory facilities, to decide, with a certainty amounting to a sort of mathematical demonstration, any mineral substance put before him.

We do not find that Professor Brush has gone into the subject of carbonaceous mineral species which would of course have appealed to a larger number of our readers; but we suppose this must be deemed a specialty apart from his own, on which we must have a special treatise some day.

GOVI ANTICIPATED BY VAN DER WEYDE.

It is now some time since Dr. Van der Weyde informed us that a patent of his years since had anticipated Govi, Barrett and Geyer, as regards the wire-gauze singing-flame. In a recent search for something else, we encountered this patent, and here put its substance on record as a matter at least of historical interest.

A GAS-BURGLAR-ALARM.—Patent No. 42,032—P. H. Van der Weyde.—March 22, 1864.—A lower cylinder of wire-gauze, to the upper end of which is attached a metallic tube. Over this tube is arranged a jointed gas-burner, and below the wire-gauze cylinder is another burner. The stopcock of the latter is connected in any suitable manner with the door or window of a house, so that should the same be opened the gas will be let on and cause a shrill continued sound sufficiently loud to alarm the inmates of the house.

Gas Items.

The present New Jersey Legislature has before it a bill for new gas works for the northern part of Hudson county. There are some twenty incorporators, among whom were Frederick Lundy, Fritz Meyer, and Charles F. Rub, of Union Hill. It is proposed to locate the works in the township of Union, near that of Weehawken, and the parties mentioned in the bill aver that they can supply the gas at least one-third less than is now charged by the Hudson County Gas Company. The action has been called forth by the demand of the people that some movement should be made to overthrow the monopoly. There is a law, however, that will have to be first repealed, which forbids any company to lay mains where another company has the right of way.

A member named Worth, of Brooklyn, brought up the customary "gas bill" to the New York Legislature on the 20th January. We do not know how to get a copy of it, and if we had it, we might not know what to do with it.

OBITUARY.—David Milne, since March 1872 superintendent of the Corsing (N. Y.) Gas Company, died in December last. The Corning *Independent*, of Dec. 23, gives some biographical details. He was born at Forfar, Scotland, in 1834, but came to this country as a boy in 1853. He was first employed by the Syracuse Gas Company, then went to Oswego, then to the Clyde (N. Y.) Gas Works in 1859. In 1863 he engaged in oil-refining, in Buffalo, and in 1865 at Weehawken, N. J., in the same business; but in 1868 went back to gas, first at Norwich, N. Y. then at Corning where he died. He is spoken of as a highly educated and superior mechanic.

INJURY TO A GASHOLDER AT STOURBRIDGE.—A very singular accident is reported as resulting from the heavy fall of snow last week. On Wednesday a large gasholder at the works of the Stourbridge Gas Company was observed to be tilted towards one side, being apparently thrown out of balance by the weight of snow accumulated upon it. On examination a fracture four feet in length was discovered, and the whole of the 55,000 feet of gas in the boiler escaped. Stourbridge the following night was only partially supplied with gas, a state of things that will probably continue for several days. The gasholder settled down in its bed without much damage, but some of the iron guide-rods were twisted by the holder being out of place.—*London Journal of Gas Lighting.*

It is with regret we observe in the Washington (D. C.) papers that things are wrong between the public and the gas company. As we have but one side of the story, however, that of the newspapers, it would be no profit to us, or to anybody, to quote. We might say, however, that there seems a plentiful lack of public confidence in the capacity of a party, to us unknown by reputation or otherwise, who acts as "gas inspector"—by appointment, it would seem, of the President of the United States.

A GAS-LEAK IN JERSEY CITY.—One of the Jersey City papers says that after many days hard labor and the burning of seven chaldrons of coke to thaw out the frozen earth that gas leak that has existed for a long time on the corner of Baldwin and Newark avenues, has been found. There was a fissure in the

main pipe over two feet long, and when it was uncovered it had to be covered again right suddenly, as the gas escape came forth in immense quantities, and at one time it was thought it would take fire and cause such an explosion as would make things rather unhealthy to all those who live in the neighborhood.

NEW JERSEY GAS ITEMS —A gas company is spoken of as about being organized in West Hoboken.

Gloucester City, N. J,, was supplied January 7 with gas for the first time.

Another New Jersey gas item is what the Jersey City *Journal* calls, in Partingtonian phanse, a "vile calomel," from the Newark *Register:* "When a stranger goes to bed in Jersey City and blows out his gas he sleeps sweetly, wakes early and never even suspects anything wrong. There is not strength enough in the gas to injure anything."

Whereupon a Hoboken paper takes up the cry, and compliments the Hudson County Gas-Light Company thusly. "Hoboken gas smells badly enough to wake up one of the seven sleepers; but when you talk about light, it isn't an element in the conversation."

Which latter we, on our own authority, founded on nightly use of the gas, must pronounce to be, *at the present time*, quite unjust.

Where there is so much cry, however. a little wool at least is to be apprehended. In news from West Hoboken, January 27, the following extraordinary statement appears: "There are 371 street lamps in the township, and combined they equal the flame of a candle."

Is this altogether *scan. mag.?*

While on trans-Hudson gas matters, it may be noted that a bill recently passed to the third reading in the pending (and impending) New Jersey Legislature to prohibit gas companies from collecting rent on their meters..

We also find the following:

"Feb. 3.—The Hudson County Gas Company has refused to accept payment of their last bill for the quarter ending January 1, for the supply of gas for the street lamps of Union Hill as reduced 25 per cent. by the Council, and have notified the Board that they will proceed to sue for the full amount, $1,584."

PHILADELPHIA.—The amount of gas made by the Philadelphia gas works in 1874 was 1,766,268,000 cubic feet, an increase over the year 1873 of 117,681,000 cubic feet. The largest consumption in any twenty-four hours was on the night of the 24th of December, amounting to 7,826,000, being an increase over the largest of last year of 587,000 cubic feet. The street mains laid during the year were 36,202 feet, making the entire length of 612 miles. The whole number of lamps on the 1st inst. was 9,904; 9,441 are supplied with gas from these works, and 464 with gas from the Northern Liberties works.—*Iron Age.*

Peat Statistics.

In Iron Manufacture.—Dr. Reynolds, Chemist of the Royal Dublin Society, states that the Great Southern and Western Railroad Company were led by the coal famine of 1872 to experiment with rough air-dried peat in the Siemens' gas generator and furnace. They did so with the happiest results, and found that for forging iron and blooming it in a scrap furnace only 5½ tons of air-dried peat were required. With the ordinary furnaces 6 tons of good coal, or 12 tons of first rate coke, were required to do th same work. The saving to them was £3 15s. per ton of iron forged.

As a Fuel.—Mr. Plast, F.G.S., stated before the Manchester Geological Society that the peat beds of Ireland covered 2,831,000 acres; those of England and Scotland, 3,500,000 acres, or about 6,000,000 acres in all. The estimated average thickness is 12 feet, and product per acre 12,000 tons. The value of the peat as fuel varies with the depth at which it is cut and the character of tle growth of the peat moss. The lower the depth in the bog at which the peat is cut the better the fuel—the bottom layer being devoid of ligneous fibres and most easily worked. Wherever owing to high situations or the neighborhood of easily disintegrated rocks, the growth of the moss is stunted, the resulting peat is less valuable and more expensive, since the fibre, being harder, retains its ligneous character with greater persistence, while the amount of ash is greater.

In Holland there are 40,000.000 tons of hard peat fuel made annually, and a royalty equal to $700,000 is paid thereon to the Dutch Government. There are over 100 patents for the conversion of peat into fuel. Two difficulties are experienced—first, the great amount of water retained by the peat and the difficulty of preparing the peat mechanically to get rid of it easily; second, the want of some quick, effectual drying process by artificial heat.

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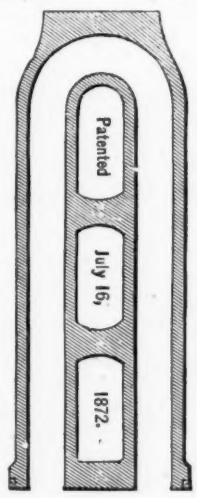

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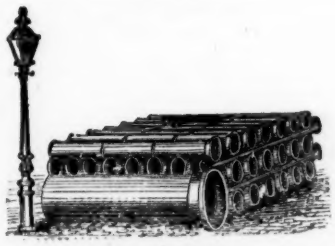

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TO GAS COMPANIES, AND CITY GOVERNMENTS.
DYOTT'S PATENT
CHAMPION STREET LAMP

Doubles the Light with the same quantity of Gas used in other Lanterns. *All others* waste half their light, illuminating the sky, or if the top is of metal, absorb it.

SINGLE TOP GLASS LAMPS BOTH GLOBULAR AND SQUARE become heated if a good light is put in them, and rain, hail or snow falling upon the HEATED GLASS BREAKS IT. When one glass is broken the wind will either blow the flame against the others and break them, or destroy the entire Lamp. *Nine-tenths of the breakage and cost of repairs of other* street lamps is owing to that cause.

DYOTT'S "CHAMPION" is the only DOUBLE TOP—the only Lamp that has the Opaline White Dome, which is a *never changing reflector;* it doubles the power of, and throws the light to a greater distance. It is also a perfect *protector*, shielding the heated top of the lamp from all inclemency of the weather. The white dome is kept cool by the passage of air between it and the transparent globe below. Rain, hail or snow will never break either the globe or dome. The globe rests upon rubber cushions, and is supported laterally by elastic springs, so that contraction or expansion of the globe, or jarring of the post will not break it. They can be cleaned in one-fourth the time required to clean other lanterns. The metallic portions are of iron, copper and brass, and are the most durable, economical, efficient and cheapest lamps in existence. For public buildings, and wherever an ornamental and powerful light is required, they are made in CLUSTERS of 2, 3, 4, 5, 6, 7 and 10 lamps, which have no equal in this or any other country for *beauty, durability, efficiency* and economy, either in cost, use or ornamentation. Designs furnished when requested for specific purposes. Gas companies, or those who have the lighting of Cities in charge, are solicited to communicate with us in reference to the agency for its introduction.

The Franklin Institute has awarded our CHAMPION LAMP the highest premium: (they give a silver medal) and its Committee on Science and the Arts has recommended it as the best lamp in use. It has also invariably taken the highest premium at every Exhibition at which it has been presented, and elicits the strongest commendations wherever it is used. We have several new and handsome patterns of POSTS for Corporations, Parks, public and private use, also for clusters of lamps, that are not excelled in beauty or price at which they are furnished. DYOTT MANUFACTURING CO.,
374-6meot, 114 South 2nd Street, Phil'a, Pa.

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Sulphate of Ammonia.

MR. CATHELS, WHO HAS HAD EXTENSIVE EXPERIENCE during the last twenty years, in the manufacture of SULPHATE OF AMMONIA, is prepared to advise Ga Companies on this profitable mode of utilizing the Ammoniacal Liquor. Drawings, Specifications, and full details of working supplied. Terms on application to E. S. CATHELS as GWorks, Montreal, Canada. 371

Gems and Generalities.

COLD AND TARDY CHARITY;—Belgian coal operators have presented $10,000 to the children of the late M. Museler. who invented the safety-lamp used in the coal mines of Belgium.

An eminent astronomer proclaims that the moon's attraction of the tides is gradualty diminishing the frequency of the earth's revolutions. This is perhaps the reason why France has unexpectedly gone without one for three years.

GUN COTTEN.—A chain of compressed cakes of guns cotten tied around the trunk of a large tree and exploded will cut it down instantly by the violence of its action. The cut through the trunk is as sharp as that made by the keenest axe.

French light houses are said to be as far ahead of those of other countries as is French light literature.

Philadelphia is congratulating herself upon having a better Fire Department, and at less cost of money than New York. The underwriters, it is said, do not coincide—opining that one need in Philadelphia is larger water mains through its business streets.

Some Bohemian, hard up for a joke, has painfully given birth to the following sad offspring:

"In a hospital at Montpelier, France, a patient has swallowed a thermometer left on his table, while suffering from temporary delerium. They have a great deal of trouble with him now. When he drinks hot coffee that thermometer flies up against the roof of his mouth hard enough to lift his hat off, and when he eats ice cream it gets down in his boots and worries his corns."

A contemporary announces that at times "the rattan exudes a dangerous poison." Young Hopeful adds that the most dangerous time is when the schoolmaster is poisin' it over a fellow.

At a fire in Jersey City January 4, a chemical fire extinguisher did good service. The flames were between the partitions and ceilings of the two upper stories of the house; holes were cut to allow the extinguishing gas to reach the flames when the machines were set in operation, extinguishing the fire in a very few minutes, without any water applied.

Russia has hit upon the original device of building wooden-clad iron vessels of war, the outer coating of timber being intended to protect the iron from injury.

SARKUZZUM (?).—The Baltimore papers say that Maryland dairymen have organized a protective union to prevent the sale of impure milk by other persons.

ANOTHER.—The milkmen of San Francisco have formed a mutual aid association. One holds the can, while another pumps.

It is now proposed that since the usefulness of whales has largely diminished through the discovery of mineral oils for illuminating purposes, the animals might be domesticated and employed for towing ships.

Bird-fanciers are exclaiming against the sparrows, which, they say, have banished all the song-birds within a radius of several miles from the city. A practical man suggests that the sparrows should be utilized for food, as they are in England, to prevent them from multiplying to an injurious extent.

In England, waste scrap-iron, turnings, and wire-clippings are put around the foot of telegraph poles when they are placed in the holes dug for them; and in gravelly soil the oxidation of the iron causes a conglomeration of the gravel into a dense, hard mass that adds much to the rigidity of the foundation.

In Bohemia, Silesia, Hanover, and other parts of the German Empire, independent of the well-known Saarbruck field, there are hundreds of miles of coal now in a fair way of being opened. The valley of Bosnia is said to be one enormous coal-bed.

Our Feejee readers will be interested in the statement by M. Moca, a French savant, that "the flesh of the Caucasian is bitter and salty, while that of the negro is of finer flavor, and will keep much longer."

J. L. CHEESMAN.

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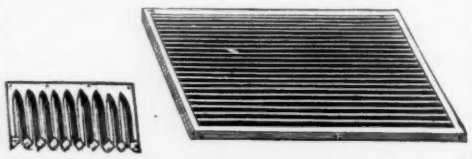

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The above Trays will last longer. and are cheaper than any Tray now used. They are now made without any outside strips, which gives more purifying surface, being perfectly smooth. The lime will not adhere to them as in other Trays They are now used in over three hundred Gas Companies the United States, and other places.

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IMPORTANT

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It has recently been discovered by actual tests, under various circumstances, that the

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and used in connection with the celebrated

Huntoon Steam Governor,

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Gas Fixtures, Etc.—Mitchell, Vance & Co., 597 Broadway..7
Gasholders, Etc.—Deily & Fowler, 39 Laurel st., Phila., Pa..4
Gas and Water Pipes—B. S. Benson & Son, 68 B'way., N Y 5
Gasometers, &c.—Keystone Iron Works—2132 Filbert st., Philadelphia.....2
Gas Screens—American Gas Screen Manufacturing Co., Haverhill, Mass.....4
Jersey City Gas Meter Works, 14 Morris st., Jersey, N. J....8
Lime Hurdles.—Manhattan Lime Hurdle Co., Geo. W. Day, Treas., No. 3 Railroad Square, Haverhill, Mass.....2
Lava Tips and Scotch Tips—Charles H. Meyer & Co., 227 Chestnut street, Phil. Pa.....8
National Tube Works Co., 78 William St., N. Y.....7
Patent Conically Slotted Wood Trays—John L. Cheesman, 147 and 149 Avenue C., N. Y.....4
Patent Gas Exhauster—Smith & Sayre, 95 Liberty street..4

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Sterling Coal—Freeman Butts, Cleveland, Ohio.....6
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Philadelphia Fire Brick Works, Vine and 23d sts., Phila....8
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Gas-Light Company of America, 63 and 64 Drexel Building, New York.....9
Kidd's Gas Consumers Guide—A. M. Callender & Co., 42 Pine Street, N. Y.....
Massachusetts Institute of Technology—Samuel Kneeland Boston, Mass.....
National Coal Gas Company—H. P. Allen, 4 Warren street New York.....6
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School of Mines, Columbia College, East 49th st.....9
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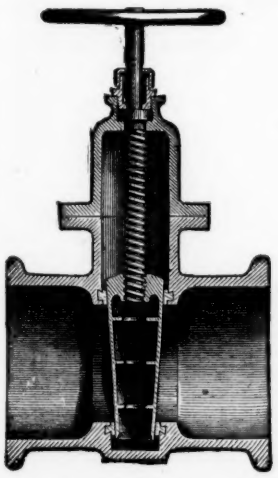

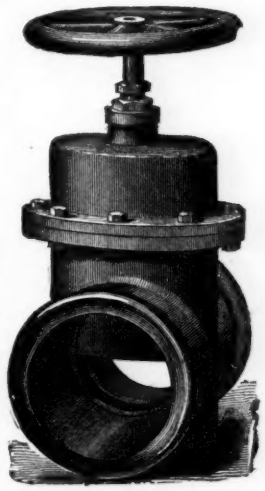

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357-tf

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New York has now 400 miles of water pipes; Chicago has 350 miles; Brooklyn, 200 miles; Boston 350 miles; Baltimore, 210 miles; Detroit, 170 miles; St. Louis, 150 miles; Louisville, 75 miles; Cleveland, 70 miles, and Milwaukee, 40 miles.—*Journal Society of Arts.*

[Commissioner Van Nort—see our issue of December 16, p. 226—makes New York more than 400 miles.]

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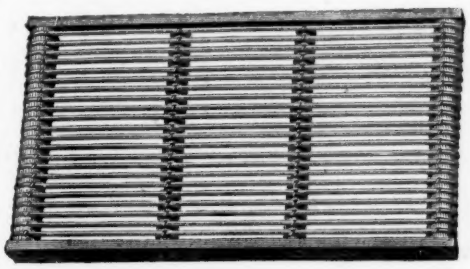

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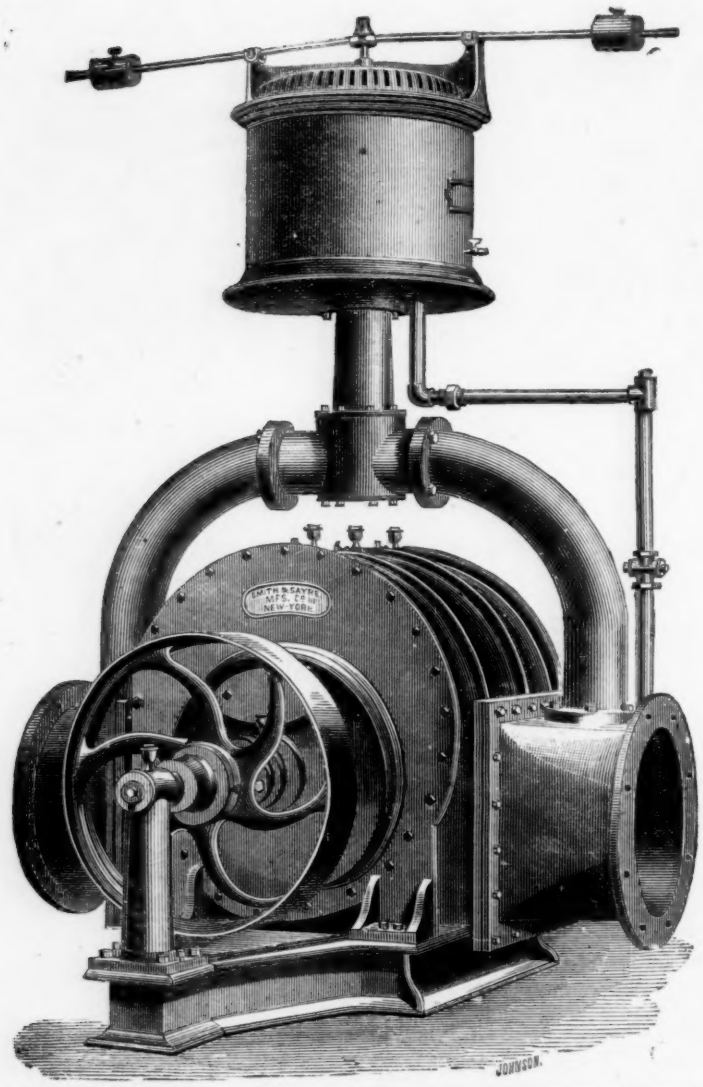

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Kirkless Hall	16 50	@	17 00
English Caking Coals.			
Newcastle Gas	$12 00	@	00 00
Liverpool caking	11 50	@	12 00
British Province Coals.			
Pictou			2 50
Block House—At Mines, $2 12, Gold			0 00
Caledonia—At Mines, $2 00, Gold			0 00
Little Glace Bay—At Mines, 1 87½, Gold			2 00
Lingan—At Mines, $2 25, Gold			0 00
Sydney—Old Mine			3 00
" Reserve Mine			2 25
" International			— —

(Duty, 75 cents per ton, gold. Freight to New York $2 25, currency. Cost of above coals delivered in New York, $5 25 @ $6 00½, currency.)

Pennsylvania Coals.			
Penn Gas Coal—At Amboy	$7 00	@	0 00
Westmoreland—At Amboy	7 00	@	0 00
(In New York both the above coals $7 50)			
Shafton	7 50	@	0 00
Youghiogheny	7 75	@	0 00
West Virginia Coals.			
MurphyRun	$7 40	@	0 00
Despard	7 40	@	0 00
West Fairmont	7 40	@	0 00
American Gas Coal	7 40	@	0 00
Fairmont	7 40	@	0 00
Newburgh Orrel	7 40	@	0 00
Pinnickinick	7 40	@	0 00
Cloverhill of Virginia	6 00	@	6 50
McKenzie Compound Mixture			— —
American Cannel Coals.			
Peytona of West Virginia	$12 50	@	00 00
Darlington of Pennsylvania			— —
Cannelton Cannel			12 50
Red Bank—at Philadelphia			7 60
" —at South Amboy			9 00
Asphalts.			
Albertite of New Brunswick	$— 00	@	— 00
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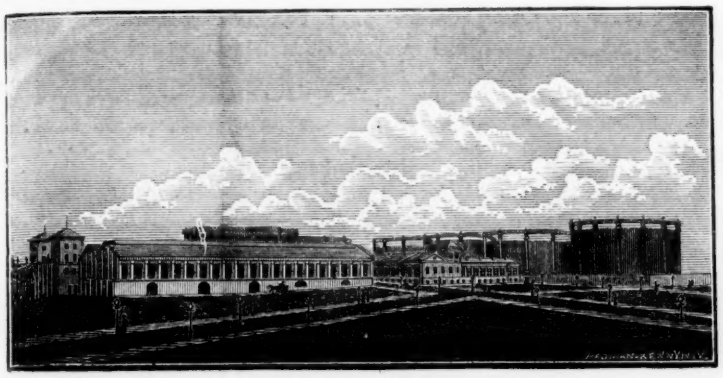

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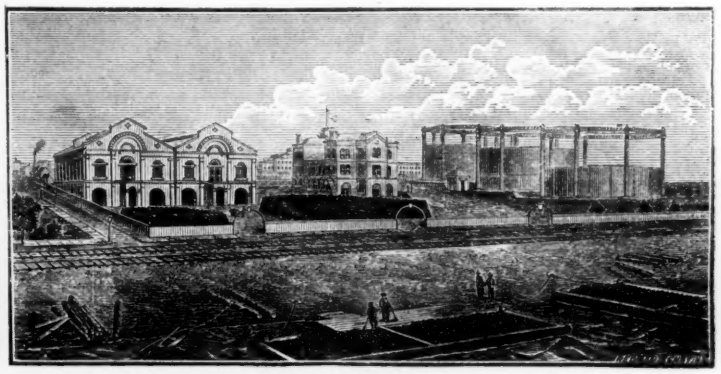

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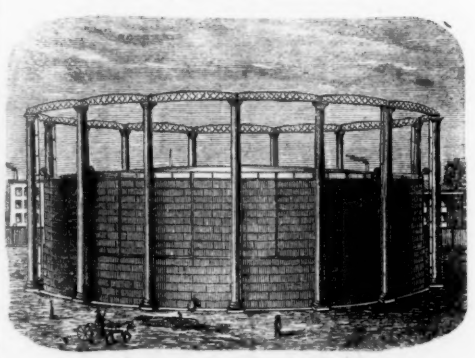

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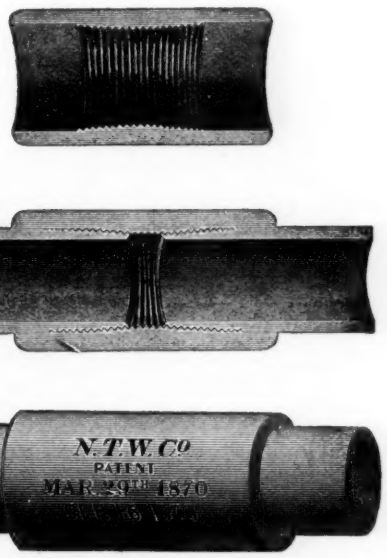

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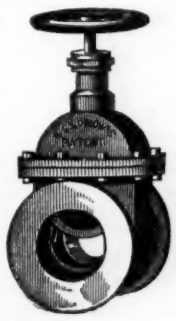

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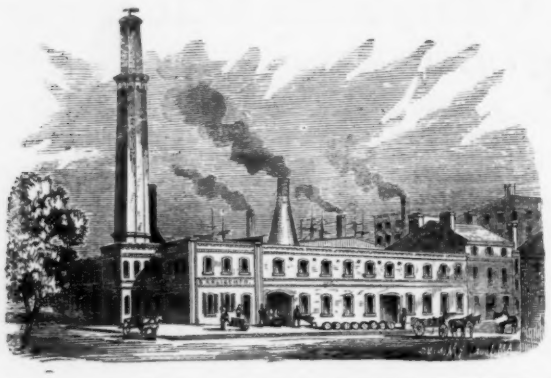

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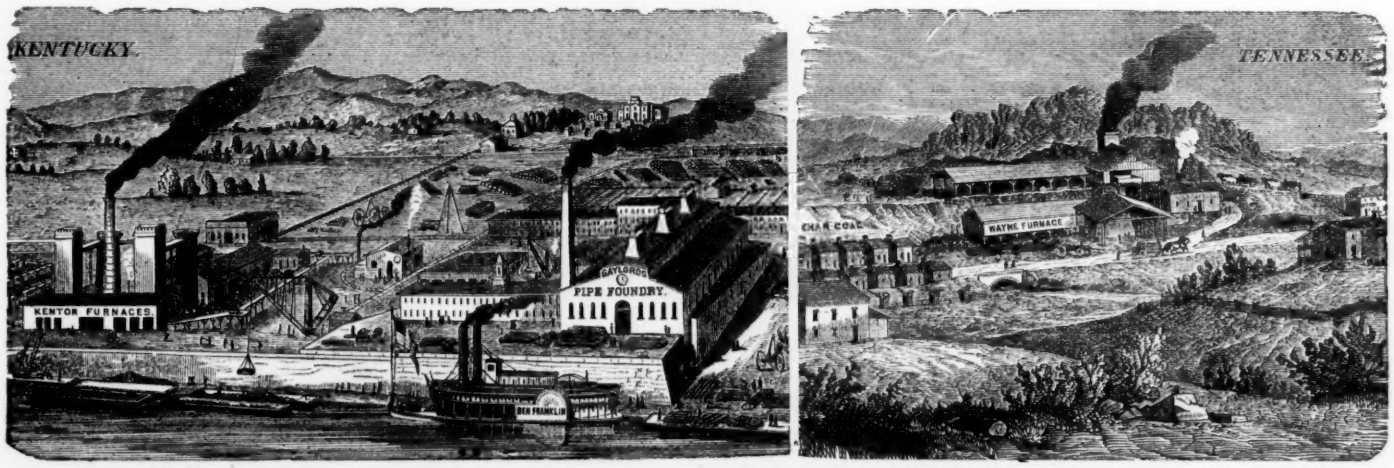

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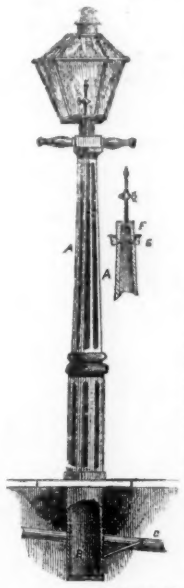

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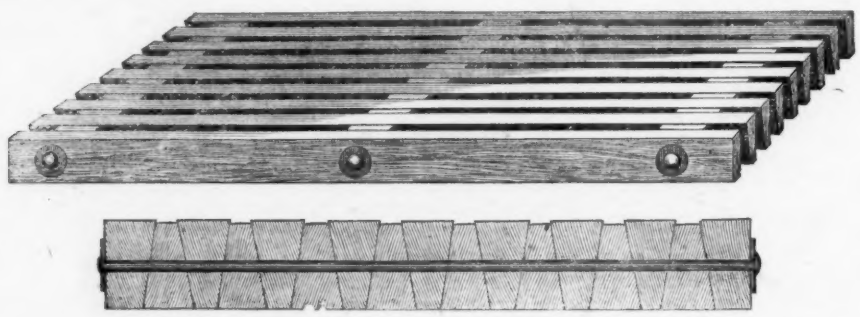

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Lynn Gas-Light Company, Mass.
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McKeesport Gas Company, Pa.
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East Newark Gas-Light Company, N. J.
Binghampton Gas Company, N. J.
Zanesville Gas Company, Ohio.

New Orleans Gas Company, La.
Salem Gas-Light Company, Mass.
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Rahway Gas-Light Company, N. J.
Trenton Gas-Light Company, N. J.
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Indiana Gas-Light Company, Pa.
Peoria Gas Company, Ill.
Montclair Gas Company, N. J.
Williamsport Gas Company, Pa.
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Augusta Gas-Light Company, Ga.
Huntsville Gas Company, Ga.
Chattanooga Gas Company Tenn.
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Hanover Gas Company, Pa.
Easton Gas Company, Pa.
Uniontown Gas-Light Company, Pa.
Coatesville Gas-Light Company, Pa.
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